Cooke's *Patent Drill Machine improvd & simplified and capable of being converted into a Horse Hoe.*

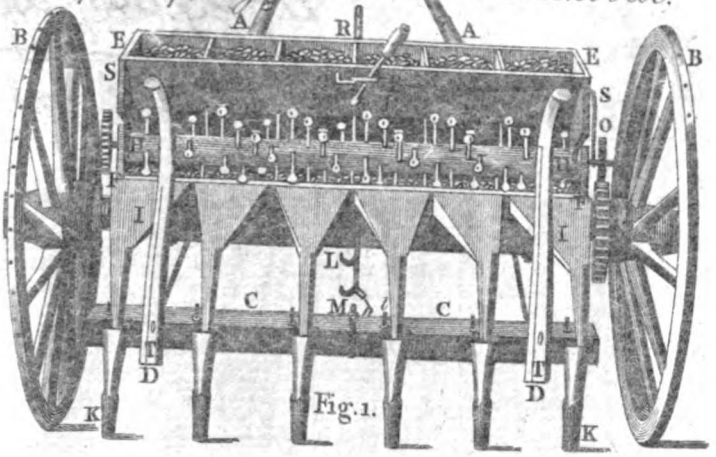

Fig. 1.

Fig. 4.

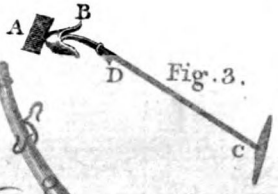

Fig. 3.

Fig. 2.

Patent Horse Hoe

del. *Published according to Act of Parliament 1st Jan.y 1789.* J.Lodge sc.

UNDER A NEW PATENT.

COOKE's

IMPROVED

Patent Drill and Horſe-Hoe.

Fig. 1. repreſents a back view of the drill when put together, ready for work.

Fig. 2. repreſents a back view of the horſe-hoe, when ready for work.

Fig. 3. repreſents a breaſt hand-hoe, but not much uſed ſince the horſe-hoe came out.

Fig. 4. repreſents a quitch-rake, not a part of the drill, but applicable to the handles of the horſe-hoe, and may be uſed for the purpoſe of cleaning land from quitch, raking ſtubbles, &c.

Directions for uſing the DRILL.

DRILLING ſhould not be attempted, but when the ſoil is dry, at leaſt ſo dry, as not to ſtick like daub to one's feet, in walking over it; unleſs to regain a late, or in other reſpects, a loſt ſeedneſs. And it is recommended to drill

upon a ſtale furrow, *i. e.* when the ſoil is mellow and friable, which it will be, in general, by remaining expoſed for ſome time after it is ploughed.

For drilling, deep ploughing is ſtrongly recommended, where the ſoil will admit of it.

It is alſo recommended to put land into ridges $4\frac{1}{2}$ feet wide, clear of the furrows in ſtrong wet lands, for one breadth of the drill; and $9\frac{1}{2}$ feet wide, clear of the furrows in dry lands, for two breadths of the drill; in which caſe, the horſe may always go in the furrow, without ſetting a ſingle foot on the land, whether in drilling, ſcarifying or horſe-hoeing, &c.

The beſt method of forming the ridges for drilling and horſe-hoeing, is to plough the land into ridges from flat work, then to plough back the ſame ridges, making the furrow where the middle of the ridge was, and the middle of the ridge where the furrow was. By this means, the ridge will be flat and level acroſs from edge to edge, which it ſhould be, in order that the ſcarificators and horſe-hoes may all work to the ſame depth; and to prevent the wheel going too deep in the furrow, the hent, (as it is commonly called) or bottom of the furrow ſhould not be ploughed up till the land is drilled, afterwards the furrow may be ploughed up or ſtripped and the earth turned each way to the ridges.

In order that the horſe may go in the furrows, the ſhafts of the drill muſt be moved to the end of the ſplinter bar, and they will be properly fixed, when the hole in the middle of the ſhaft bar is applied to the hole near the end of the ſplinter bar, and ſecured there by ſcrew bolts and nuts; when the drill is thus worked, if a chain or common trace is made faſt at the left end of the ſplinter bar, and extended to the horſe's ſhoulder, paſſing through

through a ring in the ſhaft, it will facilitate the draft. If the ridges ſhould not be made exactly to the ſize of the machine, freſh holes may be made in the ſplinter bar and ſhaft bar, ſo as to ſet the drill more or leſs upon the ridge as may be required; and by the ſame means, the wheels may be made to go in the middle of the intervals, at the time of hoeing.

Where it is not convenient to make ridges to the ſize of the drill as above, it is recommended to make uſe of the marker, which will make an impreſſion or ſcratch on the ſurface of the land, where the horſe is to return. The marker muſt be changed from one end of the ſplinter bar to the other, at each end of the land, and it is done without loſs of time while the drill is turning round. In going one way, the marker will leave an impreſſion or ſcratch, upon which, if the horſe returns, two breadths of the drill will be joined together at equal diſtances, and in going the other way, the marker will leave a ſcratch, upon which, if the horſe returns, there will be a ſpace of 14 inches, as a ſubſtitute for a furrow, in which the horſe may go without treading on the plants, when ſcarifying or horſe-hoeing are performed.

In parts of the country where very high ridges are already formed, it is recommended to drill directly acroſs the ridges, making uſe of the marker, and leaving ſpaces as above for ſcarifying and horſe-hoeing, &c. When ſuch high ridges are made level, they ſhould be ploughed before winter, and cropped with meliorating or green crops for two years, to take off the rawneſs of the ſoil. The extraordinary production of a ſoil buried in the middle of a high ridge, out of the reach of ſun and air for many years, will amply pay the farmer for his trouble in levelling the ſame.

In going from the farm to the field, the pin M, fig. 1, muſt be lifted on the hook L, which will bear the coulters off the ground, and the chain on the coulter-beam may be linked on to a hook in the axis of the wheels, to prevent the coulters receiving any injury, by coming ſuddenly to the ground. To prevent the canvas of the funnels being chafed in travelling, the funnels ſhould be taken off and put in the ſeed boxes.

The coulters ſhould be fixed exactly at equal diſtances; which is done by applying a rail with notches at equal diſtances, to the coulters when fixing, and wedging them accordingly.

If ſoil abounds with large dry clods, they ſhould be reduced by a heavy roller; and ſometimes a ſpiked roller is neceſſary for that purpoſe. Previous to land being drilled, it ſhould be harrowed ſlightly to level the ſurface.

The grain or ſeed muſt be put into the upper boxes E E, an equal quantity in each box.

The cups or ladles upon the cylinders, are of four different ſizes, and are diſtinguiſhed by the colours, white, red, green, and yellow; the white cup is for turneps; the red cup for wheat; the green cup for barley; the yellow cup for beans, oats, peas, tares, &c. &c.

Upon ſoils well cultivated, it is recommended not to ſow more than one buſhel of wheat per acre.

Barley from one buſhel to a buſhel and a half per acre.

Beans, from two, to two buſhels and a half per acre.

Peas, two buſhels per acre.

Oats, two buſhels and a half per acre.

Tares, two buſhels and a half per acre.

By

By raiſing or lowering the ſlides G G, fig. 1. a greater or leſs quantity of grain or ſeed may be ſown at pleaſure.

The idea of over-ſtocking the drills with ſeed, is very abſurd. The crops will be materially injured by ſo doing.

It is recommended to make experiments upon different ſoils, by ſowing different quantities of ſeed, in order to aſcertain the moſt approved quantity per acre.

If land is in a high ſtate of cultivation, it is hardly poſſible to ſow too little ſeed, provided the diſtribution is regular.

The funnels I I, fig. 1. are all numbered, 1. 2. 3. 4. 5. 6. and for drilling at nine inches, muſt be applied to their reſpective places, ſo as to correſpond with the numbers 1. 2. 3. 4. 5. 6. of the ſeed box; ſix coulters being fixed in the coulter beam, at the diſtance of nine inches from each other.

For drilling at twelve inches apart, five coulters muſt be fixed in the beam, at eleven inches and a quarter from each other, when the order of the funnels will ſtand 1. 4. 5. 2. 3. 6. and no ſeed put in the box oppoſite the funnel No. 5. when placed as above; the waſte funnel may be ſtopped with paper to receive any ſeed that may accidently fall therein.

For drilling at eighteen inches apart, three coulters muſt be fixed in the left end of the beam at eighteen inches from each other, when the order of the funnels will ſtand 1. 2. 3. 4. 5. 6. and ſeed put in the boxes oppoſite the funnels 1. 3. 5. only, the other boxes being empty.

For drilling at twenty-two inches, three coulters muſt be fixed in the beam, one at each end, and one in the middle, when the order of the funnels

nels will ſtand 1. 4. 5. 2. 3. 6. Seed being put in the boxes, oppoſite the funnels 1. 5. 6. only, the other boxes being empty.

Two rows of peas or beans at nine inches apart and a ſpace of twenty-ſeven inches alternately, have been tried and approved. The ſpace of twenty-ſeven inches will admit of the land being frequently ploughed with a common plough ſo as to make a good clean fallow for wheat.

As the machine approaches the land intended to be drilled, the lever P. fig. 1. ſhould be lifted from the notch in the ſtaple Q, when the coulters are two feet on this ſide the exact place, where ſeed ſhould be depoſited; and the pin M removed from the hook L, by lifting up the handles D D.

When the machine arrives at the end of the land, the lever P muſt be moved to the notch Q, which will ſtop in an inſtant the diſtribution of the ſeed, and the pin M lifted on the hook L, which will ſupport the coulters out of the ground, while the machine is turning round.

If the coulters ſhould not make the inciſions or drills ſomething more than two inches deep in light ſands or loams, and not quite two inches deep (one and half is recommended) in ſtrong clays or wet ſoils, they may be forced into the ground by the hand; or by weights, or a beam of wood four feet long, and three or four inches thick, tied to the handles of the machine for that purpoſe.

If, in attempting to make the drills ſtraight, the horſe ſhould deviate from his proper direction, the coulter beam with all the coulters will be readily moved, this or that way at pleaſure; ſo as to make the drills ſtraight by counteracting the horſe's line of traction.

If

If the machine ſhould happen to be too wide for any given ridge, one or more funnels may be ſtopped with a little looſe paper, and the ſeed received into ſuch funnel, returned into the upper ſeed-box.

In drilling narrow high-ridged lands, the outſide coulters may be lowered, and the middle ones raiſed, ſo that the points of the coulters may form the ſame curve which the ridge forms.

The top of the ſeed-box when ſhut, ſhould be kept nearly level, the front edge rather higher, whether going up or down ſteep hills, or on level ground. This will make the diſtribution of the ſeed uniformly the ſame. The higher the front edge of the box is raiſed upon the bar R, the ſeed will deſcend more copiouſly into the lower boxes, conſequently a greater quantity will be diſtributed.——The ſeed-box is raiſed or lowered by applying the hand to the handle of the crank, and moving it at pleaſure, without ſtopping. The perſon who attends the machine, ſhould ſee that the ſeed is delivered over the edge of the ſeed-box into the funnels: if the ſeed falls into the lower boxes, from whence it was taken up by the cups, it is a proof that the box wants raiſing in the front.

The lower funnels placed behind the coulters ſhould be laſh'd faſt to the coulters with leathern thongs, or cords: and if in lifting up the coulter beam at the ends of lands, the upper funnels ſhould by chance be diſplaced, a ſmall nail may be driven into the edge of the ſeed-box cloſe above the edge of each funnel, which will prevent the funnels being diſplaced.

If weeds accumulate upon the coulters, they muſt be diſplaced by a paddle; if land is dry, weeds will not be very troubleſome; but if wet and clammy, and full of quitch, it will be troubleſome,

bleſome, and more or leſs prevent the ſeed being diſtributed regularly in the drills. Such lands had better be made a fallow of, in order to clear them from weeds, than drilled with any corn whatever. This would be productive of greater profit to the cultivator, and more credit to the drill ſyſtem at large.

When a piece of land is drilled, it muſt be harrowed once in a place with common light harrows, to cover the ſeed and level the ſurface of the ſoil, as a preparative for horſe-hoeing. If the harrows are taken in the direction the drills are made, there will be no danger of diſplacing the ſeed.

Seed wheat ſhould be limed and brined two or three days before it is uſed, and made dry by ſpreading it thin on a boarded floor, to prevent its heating ſo as to kill the ſeed. If ſeed wheat is freſh limed and brined, the lime by acting as a cement, may cauſe it to clog in the cups. If this ſhould happen upon the field, in hazy foggy weather, ſo much unlimed wheat as will make it ſeparate may be mixed therewith.

Wheat ſhould not, on any account whatever, be depoſited more than two inches deep (one inch and half is recommended) in ſtrong clays or wet ſoils, nor leſs than two inches deep in all dry ſoils. The moſt approved depth is readily aſcertained, in ſoils of different textures, only by obſerving at what depth under the ſurface of the ſoil, the ſecondary or coronal fibres of plants, are formed in the ſpring.

Land intended to be drilled with carrot-ſeed ſhould be deep ploughed; and for every half acre of land, one buſhel of ſawduſt and one pound of carrot ſeed ſhould be provided.

The ſaw-duſt muſt be well dried and ſifted, to take out all the lumps and chips, and divided

into eight equal parts or heaps. The carrot ſeed muſt likewiſe be well dried, but not ſo as to kill the ſeed, and rubbed between the hands to take off the beards, that it may more readily ſeparate; and being alſo divided into eight equal parts, one of the above parts of ſaw-duſt, and a part of carrot ſeed, muſt be well mixed, and incorporated together, and ſo on with all the reſpective portions of ſaw-duſt and carrot-ſeed, till they are well mixed and incorporated together; in which ſtate, the ſaw-duſt with carrot-ſeed intermixed, may be drilled with the wheat cups or ladles, painted red. Carrot-ſeed reſembling ſaw-duſt very much in ſize, roughneſs, weight, adheſion, &c. and being well mixed with ſaw-duſt, will remain ſo mixed during the ſowing. One of the cups filled with ſaw-duſt, will, upon an average, contain three or four carrot-ſeeds, by which means carrot-ſeed will be as regularly diſtributed in the drills, as any other grain or ſeed whatever.

If the wind ſhould be high, when carrot or any other ſeeds are ſown, it may be neceſſary to fix a ſcreen of mat or canvas before the ſeed-box to keep off the wind. By this and the two ſide wings S S. fig. 1. the ſeed will be perfectly ſcreened from wind or rain.

Directions for Scarifying and Horſe-Hoeing.

THE frame of the drill conſtitutes the horſe-hoe and ſcarificator, only by taking away the ſeed box, the cylinder, the funnels, and the coulters; introducing the hoe ſhanks, inſtead of the coulters: and applying the hooks of the rails by which they are drawn into the racks C C. which are affixed to the back of the axis. *(See the plate fig.* 2.)

The ſcarificators and hoe plates are all fitted into their reſpective ſhanks, which will be readily done by correſponding notches cut with a file,—both in the hoes and ſcarificators, alſo in the ſhanks.

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For ſcarifying, the ſhanks ſhould be fitted in the beam exactly at the ſame diſtances the coulters were fixed for drilling, and the ſhank ſhould ſtand five or ſix inches above the beam; and, for hoeing, the ſhanks ſhould be about two inches above the beam: but a little practice will ſoon point out the proper manner of fixing them.

If the ſcarificators, or hoes, work too much upon the toe, it is a proof the ſhanks ſhould be raiſed in the beam, or a weight applied to the handles to force them deeper into the land.

In ſcarifying or horſe-hoeing ridges made to the ſize of the drill, the horſe muſt go in the furrow; and, if the perſon who attends the ſcarificators, or hoes, will keep his eye continually on one of the ſcarificators, or hoes, ſo as to keep it in the middle of the ſpace between the rows of corn, he need not pay the leaſt attention to all the reſt; if they are fixed at equal diſtances, they will be ſure to be at work in their proper places.

All drilled crops ſhould be ſcarified two or three times in the infant ſtate of the plants, before they begin to tiller, afterwards the horſe-hoeing may take place. And, if the earth is laid upon the plants by ſcarifying, ſo as to ſmother them, a light pair of harrows, or a buſh harrow, ſhould be taken acroſs the drills immediately after, when the ſoil is dry, which will remove the earth from the plants.

Some young practitioners in drilling, have been terrified at the thought of harrowing acroſs drilled corn; but, on trial, their fears have diſappeared, and the practice has been found a moſt excellent one, when uſed diſcriminately, with harrows of a proper weight for ſoils of different textures, the land being always dry.

When the land is dry, and the ſeaſon favourable for ſcarifying, it ſhould be repeated two or three times

times in the ſpace of a week, or ten days before the plants begin to tiller, and, occaſionally, whenever the ſoil is caked, or cruſted on the ſurface.

When barley, or oats, are laid down with ſeeds, the ſeeds muſt not be ſown, as uſual, at the ſame time, but juſt before the laſt hoeing, which ſhould not be later than the firſt or ſecond week in May; the barley, or oats, ſhould, conſequently, be drilled the beginning or middle of April.

Experiments have been made the two laſt ſeaſons, in drilling clover ſeeds in the ſpaces between the rows of corn, when the corn has been about eight or ten inches high, and has ſucceeded ſo well, that an extra cylinder is now prepared for that purpoſe, but not forwarded unleſs ordered. The extraordinary advantages that will ariſe from cultivating a crop of drilled clover, by ſcarifying and horſe-hoeing the intervals, as ſoon as the crop of corn is carried, and repeating it the ſpring following, muſt be ſelf-evident.

In working the ſcarifiators and hoes, the perſon who attends them, will move them to the right or left, ſo as to keep them in the middle of the intervals with moſt eaſe to himſelf, if he lifts up the handles a little, at the inſtant he moves them; and if the ſcarificators and hoes of one end of the beam have an inclination to go deeper than the other, in ſide lands, they may be made to go to an equal depth, by ſetting the rail, on that ſide, higher in the rack by which it is drawn.

If, in any particular ſoils, the horſe-hoes ſhould not earth up ſufficiently to the plants, a ſmall hay-band may be lapped round the ſhanks, juſt above the hoe plates, which will earth up in proportion to its thickneſs.

In order to ſave the trouble of taking the coulters out of the beam, and fixing the ſcarificators or

hoes in their places, it is recommended to get made a beam exactly the ſize of the coulter beam, to be uſed for ſcarifying and hoeing only; in which caſe, the coulter beam, with all the coulters fixed, may be taken from the handles altogether, by taking out the bolts; and the ſcarifying beam, with all the ſcarificators fixed, may be introduced into its place. And, if the ſaid ſcarifying beam is made a foot longer than the coulter beam, with two additional holes, an additional ſcarificator or hoe may be uſed; by which means, the wide ſpace, or horſe-path, may be ſcarified or hoed, as well as the intervals between the drills.

If a rail of wood is laid acroſs the ſplinter bar, alſo acroſs the axis of the wheels, and ſecured there with cords extending as far out as the ſcarificator-beam, with a hook in the end of it, like the hook L, fig. 1, it will be uſeful in ſupporting the ſcarificator-beam off the ground.

With reſpect to the very important object of ſcarifying, the object to which every adventurer in the drill ſyſtem ſhould look for his ſuperior profits; as the horſe goes in the furrow, the firſt proceſs may take place as ſoon as the ſoil is a little dry upon the ſurface, when it is ſo wet within, that it would be impoſſible for a horſe to go upon it without poaching, and for a ſimilar reaſon, that is, by the horſe going in the furrow, the laſt hoeing may be performed, when the crop is beginning to ſpindle for going into ear, and otherwiſe too high for a horſe to go amongſt it without much injury; in ſhort, by converting land into ridges four feet ſix inches, for one breadth of the machine, or nine feet ſix inches for two breaths of the machine, ſo that the horſe may always go in the furrow, without ſetting a ſingle foot upon the land, the common farmer will ſoon find how eaſy and practicable it

it is, by drilling, ſcarifying, and hoeing, to introduce the culture of gardens upon the moſt extenſive farm.

At the laſt hoeing of all drilled corn, turnep, or rape or cole, &c. may be ſown, which will afford a beneficial crop for ſheep or cattle in winter.

From the extraordinary ſucceſs which has attended a proper uſe of the ſyſtem of drilling and hoeing in general; individuals in hopes of equal ſucceſs, have been induced to adopt the ſyſtem; but ſhameful to tell, under ſuch abſurd practices, as could only ſerve to bring it into diſrepute; not only by uſing the drill upon land ſhamefully exhauſted, and otherwiſe ſo foul and out of condition, as to afford no hopes of ſucceſs whatever; but alſo by neglecting the uſe of the ſcarificators and hoes entirely.

By this means individuals have wounded the reputation of the drill ſyſtem materially, and retarded its progreſs, by attempting to introduce it upon their lands, with an eye to the circumſtance of drilling only for ſucceſs; without paying the leaſt attention whatever to the circumſtances of ſcarifying, or hoeing, than which nothing could be more abſurd.

When the ſcarificator and horſe-hoe are conſidered as the immediate and moſt eſſential cauſe of ſucceſs in drilling; and the drill an accommodation to the ſcarificator, or hoe, the extraordinary ſucceſs which has attended a proper and ſeaſonable uſe of both, in numberleſs inſtances, will ceaſe to appear any longer myſterious to thoſe, who have made an improper uſe of the drill, and totally neglected the uſe of the ſcarificator and hoe. If weeds are ſuffered to grow all over the ſpaces between the drills at twelve inches apart; the chance of their choaking the corn will be in their favour, nearly as 11 to 1: whereas,

whereas, if the weeds are in the firſt place diſturbed in their infancy by the ſcarificator, and afterwards cut up by the hoe, the triumphant ſtate of the crop over the weeds, will then be as 12 to 0.

Such ſtrong weeds as may grow in the rows of corn, and out of the reach of the hoe to cut up, ſhould be pull'd by hand, to prevent their coming to maturity, and dropping their ſeeds upon the ſoil, which has been previouſly made clean by hoeing.

As far as my obſervations have extended, it appears an object of the greateſt importance, to ſcarify all drilled crops of wheat and rye, as early in the ſpring as poſſible, viz. in the month of February, if the ſoil is dry enough to admit of it, in order to break the firm texture of the ſoil, which it may have acquired by remaining undiſturbed during the winter: At all events, the firſt proceſs of ſcarifying ſhould take place in all ſoils; and in ſome ſtrong obdurate ſoils, it ſhould be repeated two or three times, before the plants begin to tiller or multiply. This will improve, enrich, and meliorate the ſoil, in the ſpaces between the drills; the conſequence of which will be, a conſiderable increaſe in the number of ſtems, ſize of ears, &c. For the number of ſtems tillered, will be exactly in proportion to the production or fertility, the richneſs or poverty, the kindneſs or unkindneſs of the ſoil, at the very time of tillering; hence, the propriety of pulverizing the ſoil by ſcarifying it, ſo as to permit the air to enter, and the tender fibres of plants to extend freely in queſt of food; hence, the propriety of reducing the ſoil in the ſpaces between the drills, to the beſt ſtate of cultivation of which it is capable, before the tillering begins to take place; In which caſe the farmer may rely upon ſo many

many ſtems being tillered, as the land is afterwards able to ſupport, and bring to maturity. On the contrary, if the pores of the ſoil are too much cloſed to admit the air, which is the life of vegetation; if the texture of the ſoil is too firm to admit the tender fibres of plants to extend, at the time of tillering, the farmer need not be ſurprized at ſeeing a deficiency in the number of ſtems, with ſmall ears, and light grain in proportion, excluſive of the danger of an after-growth, or unſeaſonable tillering of ſtems, which will be quite green when the crop is ripe. On this account, it would be very eligible, and of importance to know or foreſee the exact time of plants beginning to tiller, in order to prepare the ſoil accordingly, by ſcarifying it in due time: But this is impoſſible to know; and it is with regret that I ſay it cannot be known, otherwiſe than by taking a few plants out of the ground, and obſerving, whether the ſecondary or coronal fibres are then formed from a knot or joint on the original ſtem, about an inch or an inch and a half under the ſurface of the ſoil; for the time of plants beginning to tiller, will vary as the ſeaſon varies, whether wet or dry, hot or cold, early or late; alſo as the land varies, whether wet or dry, light or ſtrong, rich or poor, ſheltered or expoſed; and the inſtant that the ſecondary or coronal fibres begin to exiſt, that inſtant the tillering of the ſtems will commence, though imperceptible to the naked eye.

Since, therefore, it will be found of real and eſſential ſervice to all crops of corn, to ſcarify them before the plants begin to tiller, it is recommended (as the exact time of tillering cannot be foreſeen) to ſcarify as early as poſſible; the ſooner the better, and, in my opinion, the oftener the better, previous to the tillering; and when the plants have done tillering, being

being about ſix or ſeven inches high, the horſe-hoe may be uſed to great advantage in cutting up the weeds, and earthing the ſoil to the rows of corn, whenever the land is ſufficiently dry.

The above obſervations on ſcarifying and hoeing wheat and rye are alſo applicable to ſpring corn, viz. barley and oats. The tillering of theſe plants will, like wheat and rye, be found, on examination, to take place at different times, juſt as ſeaſons, ſoils, and ſituations vary; but, in general, about three weeks after the grain is ſown. The cultivator will find his intereſt in embracing ſeaſonable opportunities of ſcarifying theſe crops alſo before they begin to tiller; and in horſe-hoeing them afterwards. Beans, peas, tares, may be ſcarified and hoed from the time they are above ground till they are too high.

Theſe remarks on ſcarifying and hoeing are offered, in hopes they will be duly put in practice. The preſent advantages will be great; but greater ones will be found in reverſion, by keeping the land clear from weeds, and at the ſame time preparing it for future crops.

Since, therefore, the advantages of ſcarifying and horſe-hoeing are evidently ſo great, too much attention cannot be paid to the circumſtance of doing the buſineſs at proper and ſeaſonable times, when the ſoil is dry. If two things cannot be done at one and the ſame time, ſurely it is adviſeable to ſecure the preſent moment for doing that which is of the greateſt importance, and leave the other to be done ſome other time. For inſtance, if men and horſes are at work at the common plough, and the latter part of the day ſhould turn out favourable for ſcarifying or horſe-hoeing, by all means let the men and horſes quit the common plough, and go to ſcarify and hoe; for if rain ſhould fall in the even, or next day, and force the crop ſo expeditiouſly as to exclude the uſe of the ſcarificators or hoes,

hoes, in all probability the neglect will be attended with the loſs of more pounds than all the men and horſes would have gained pence, by continuing at the plough.

When practitioners in drilling begin to look upon the proceſs of ſcarifying and horſe-hoeing, at proper and ſeaſonable times, as eſſentially neceſſary, and conducive to their intereſt, (as farmers in the old way do, to plough their land, before they ſow it) then, and not till then, will the drill ſyſtem be practiſed as it ought to be, or with ſuch beneficial effects as actually belong to it; and, to practiſe it otherwiſe, is doing it only by halves.

Some ſoils have been found too hard and ſtoney for the horſe-hoes to work pleaſantly, but none have been found ſo obſtinate as to bid defiance to the ſcarificators: the repeated uſe of which will prove in ſuch ſoils a good ſubſtitute for horſe-hoeing.

All ſtrong ſoils, intended to be drilled in the ſpring with beans, peas, tares, oats, or barley, ſhould be deep plowed before winter, and not plowed any more in the ſpring: however loudly this method may be exclaimed againſt by ſome, it is nevertheleſs practiſed by others with good effects. If, at the time of ſeedneſs in the ſpring, the land ſhall be thought too cloſe and compact, let the ſcarificators be uſed upon it, weighted ſo as to force them into the ſoil four inches deep at leaſt; this, if the ſoil is tolerably dry, will break it up, and leave it lighter than if it had been freſh ploughed: and, if weeds alſo appear at the time of ſeedneſs, they may be cut up by the horſe-hoe, and the land will afterwards be leſs productive of weeds during the growth of the crop, than it would have been after a freſh furrow. In ſhort, by this means, the ſoil by being expoſed to a winter's froſt, and the influences of the atmoſphere, alſo ſcarified and hoed as above, which will not coſt

ſo much as once ploughing, will be in better condition for drilling in the ſeed, and more certain of a crop, than by the common method of ploughing a little time only before ſeedneſs.

Of all weeds, quitch, or couch, is the greateſt enemy to drilling; it may, indeed, be very much curbed and weakened by repeated ſcarifying and horſe-hoeing; but where it abounds, a good ſummer fallow, the land being ploughed before winter, is the beſt and moſt effectual cure: after which, if a good rotation of crops is adopted, and two exhauſting or white ſtraw crops never taken two years together, but an exhauſting and a meliorating one alternately, and thoſe drilled, ſcarified, and horſe-hoed in a proper manner, it will not be able to injure or interrupt the cultivator materially.

If adventurers in the drill ſyſtem could be prevailed upon to remember, ſo as never to loſe ſight of the idea, or forget, that the ſyſtem itſelf is founded on ſcarifying and hoeing, *i. e.* cutting up the weeds in the ſpaces between the drills, pulverizing the ſoil, ſo as to admit the air and dews to the fibres of plants, and earthing up the ſoil to the rows of corn, ſo as to cauſe fibres to iſſue from the firſt joints of the ſtems above the ſurface of the ſoil, which otherwiſe would not have exiſted; remembering alſo, that all this buſineſs, formidable as it may have appeared heretofore, is now done for the trifling expence of 6d. or 8d. an acre, each proceſs; ſurely it would be difficult to find a ſingle adventurer ſo remiſs, as to neglect doing this buſineſs at proper times and ſeaſons, which is indeed all that is required, to inſure ſucceſs.

However doubtful it might be a few years back, whether the ſyſtem of drilling would ever become general, there is now every reaſon to believe, that it will in a few years more become the prevailing ſyſtem with all the active, the induſtrious, and enlight-

lightened cultivators of this iſland; indeed, it is already become the favorite ſyſtem with multitudes, upon ſo extenſive a ſcale, that individuals, who thro' an improper uſe of the ſyſtem, and not meeting with equal ſucceſs, begin to find themſelves hardly at liberty to condemn it; as this would only ſubject them to the reproach of their more active, more ſucceſsful friends and neighbours; but ſeem rather diſpoſed to adopt their ways and methods; by this means many converts are daily made; and as one ſingle convert will make many more, there is every reaſon to believe, that the ſyſtem will ſoon become general; and whenever that period arrives, I can with the greateſt propriety, and without fear of running into error, pronounce, that the Rental of this iſland, as far as relates to the cultivation of land in tillage, will be more than doubled.

*** *It is requeſted theſe few pages may be put into the hands of the perſon who has the ſuperintendance of drilling, ſcarifying, or horſe-hoeing.*

FINIS.